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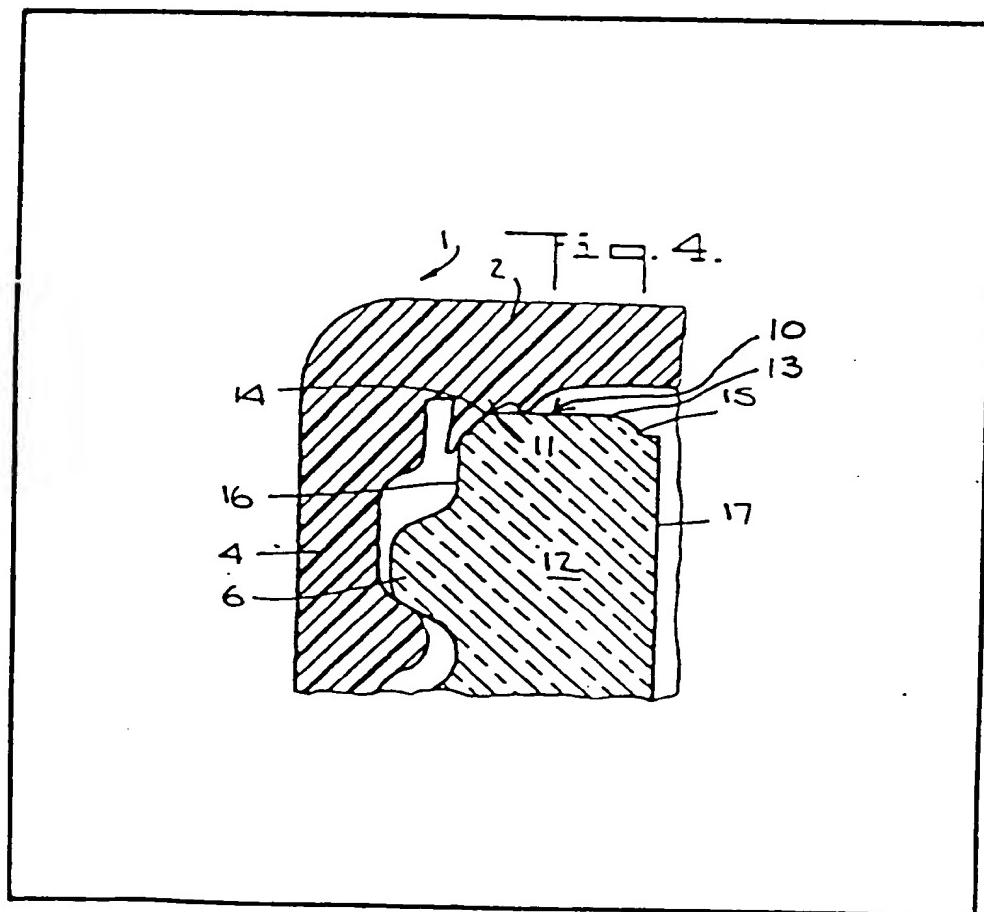
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(54) Closure caps and packages
incorporating such caps

(57) A one-piece moulded closure cap
(1) having a cover (2) and a depending
skirt (4) with threads (5) for engaging
threads on the container, comprises a
downwardly projecting sealing rib or

ring (11) on the underside of the cap
cover positioned for engaging the
outer corner of the container rim (10).
The sealing ring has a flared and
curved radially inner corner-sealing
surface (19) including an intermediate
ring-like projection (18) which
engages the top surface (13) of the
container rim (10).



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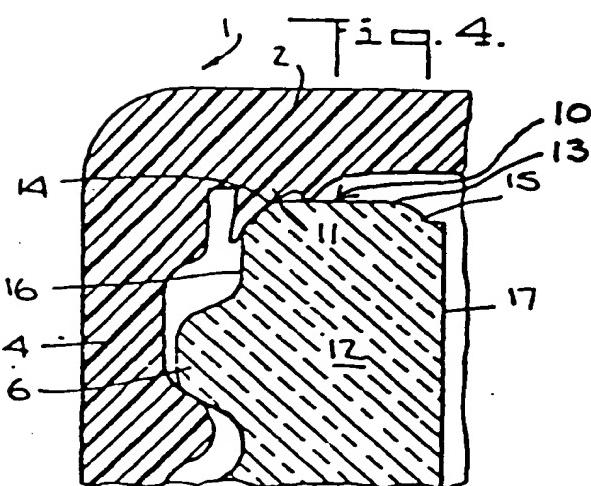
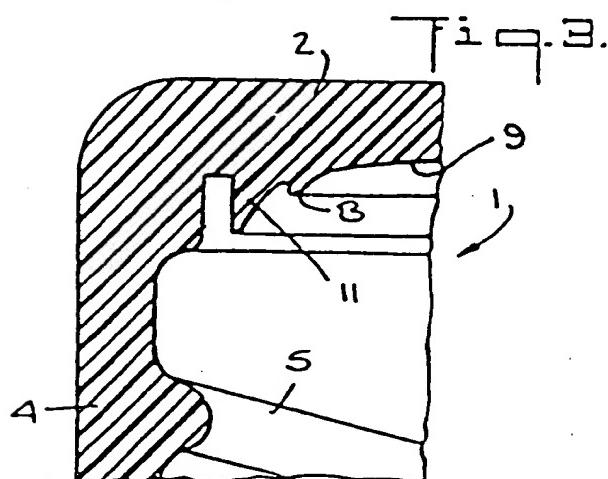
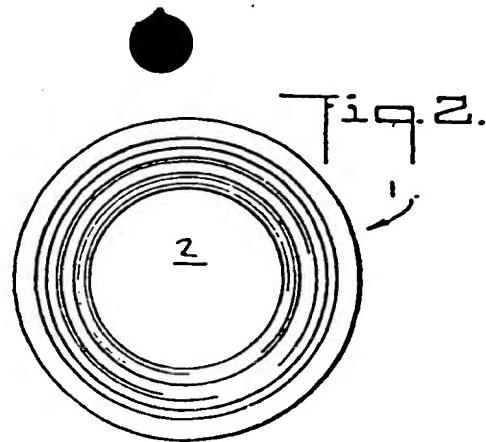
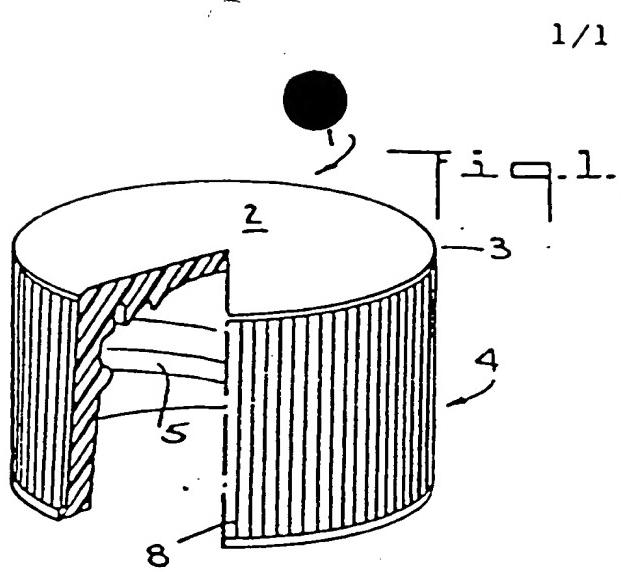
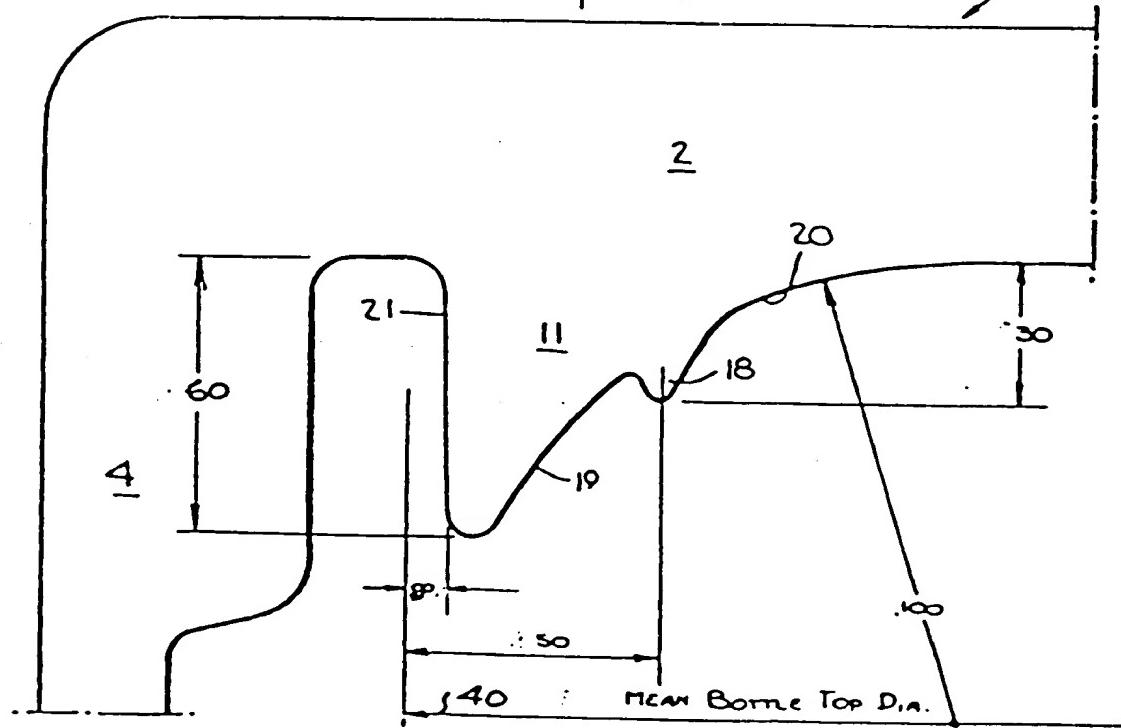


Fig. 5.



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SPECIFICATION**Closure caps and packages incorporating such caps**

- This invention relates to an improved linerless closure cap of the type used to seal beverage and other containers and more particularly to a one-piece moulded closure cap having an improved sealing means formed as an integral portion of the closure cap cover.
- 5 Linerless, moulded, plastic closure caps have now been used for some time as, for example, the closure caps described in Canadian patents Nos. 955,886 and 987,260. The closure cap of this invention represents a significant improvement upon these prior linerless closure caps.
- 10 Closure caps of this general type are one piece caps moulded of plastic with all elements of the cap including the sealing means or cap gasket comprising integral parts of the moulded closure.
- 15 The caps are characterized by having sealing fins or rings formed on the underside of the cap covers, the rings being integral moulded portions of the cap inner cover surface. These caps are particularly useful on beverage containers, including alcoholic beverages or other alcohol-containing mixtures where an excellent evaporation-proof seal must be provided. Such a seal, for example, must be sufficiently tight to be effective with container pressures in excess of 20 about 275 kPa and for preventing evaporation losses from easily vapourized products, including 25 alcoholic beverages.
- According to one aspect of the present invention, a one-piece moulded closure cap has a 30 cover, a depending skirt with container-engaging means on the skirt for engaging cap-engaging means on the container rim finish below a container-engaging edge on the outside of the rim, and a circular sealing portion on the 35 underside of the cap cover having a flared and curved inner sealing surface for sealing engagement with the container rim outer edge and having a shorter downwardly projecting sealing ring positioned intermediate the margin of 40 said sealing surface.
- According to a second aspect of the present invention, a sealed package includes a container sealed with a one-piece moulded closure cap having a cover and a depending skirt with 45 container-engaging means on the skirt engaging cap-engaging means on the container rim finish below a cap-engaging edge on the outside of the rim, a circular sealing portion on the underside of the cap cover having a flared or curved inner sealing surface in sealing engagement with an outer edge on the top of the container rim and also having a shorter downwardly projecting sealing ring positioned intermediate the margins of 50 said sealing surface.
- 55 The closure caps of the present invention thus have sealing rings with significantly improved shaping to achieve effective sealing in a closure cap which is readily manufactured and which in

particular is easily stripped from the cap forming mould.

The invention may be carried into practice in various ways but one closure cap embodying the invention and a sealed package including the closure cap will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a perspective view, partially cut away, of the closure cap;

Figure 2 is a top plan view of the closure cap of Figure 1;

Figures 3 and 4 are enlarged fragmentary sectional views of the closure cap of Figure 1 respectively before and after application to a container; and

Figure 5 is an enlarged detailed sectional view illustrating the sealing ring of the closure cap.

A closing cap 1 in accordance with the present invention has a substantially flat cover 2 with a generally circular edge 3 terminating in a

downwardly extending cylindrical skirt 4. There are a number of container-engaging members 5 formed on the interior surface of the skirt 4 which engage cooperating fastening member 6 (Figure 4) on the container 7. In the illustrated embodiment, these comprise continuous threads 5 formed on the inner surface of the skirt 4 and threads 6 on the container. In order to facilitate cap application and removal, the outer surface of the skirt 4 preferably has knurls 8 for facilitating

the gripping of the closure cap 1 during application or removal.

The closure cap 1 has a generally flat inner cover surface 9 which faces the container rim 10 during cap application. An improved sealing means is formed as an integral portion of the cap cover surface 9 during the moulding of the closure.

As can be seen from Figures 3 and 4, the cap is formed with a sealing rib or ring 11 which engages the rim 10 of a sealed container 12. The rim 10 comprises a generally flat upward facing rim surface 13 which has rounded corners 14 and 15 leading to the container outer rim surface 16 and inner rim surface 17 respectively. Relatively

slight angular areas on the outer and inner rim corners result from the action of typical container rim mould rings. The outer edge on the container could, instead of being rounded, comprise a step or a bevel.

The sealing ring 11 on the under surface of the closure cap cover 2 is positioned to be turned downwardly into sealing engagement with the outer corner 14 of the container rim 10. This sealing engagement is illustrated, for example, in

Figure 4 which shows a closure cap 1 in sealing engagement with a typical bottle or other container 12. In this position, the sealing ring 11 has been moved into engagement with the outer corner 14 of the rim 10 and has engaged at least the uppermost and lowermost portions of the container corner leaving only a minor portion of the corner, if any, out of sealing engagement with the sealing ring 11.

Additionally, a seal has also been made between an intermediate and shorter sealing ring 18 and the generally flat and upwardly facing top surface 13 of the container rim. When the closure cap 1 has been turned or otherwise moved downwardly to this sealing position, an effective vapour-proof seal results between the closure cap 1 and the container 12 with a significant sealing area being provided between the sealing ring 11 and the container rim corner 14 as well as a secondary or continuing seal between the secondary ring 18 and the upwardly facing surface 13 of the container rim 10.

Figure 5 illustrates in greater detail the preferred form of the sealing ring 11 and its relationship to the skirt 14 and cover 2 of the closure cap 1 as well as its preferred shaping for the downwardly and inwardly facing surfaces which provide the seal between the closure cap 1 and the container 12.

Certain representative dimensions and radii are shown for a typical bottle of about a 28 mm size.

The sealing ring 11 comprises a downwardly directed projection having a generally triangular cross section. The ring 11 has a principal lower sealing surface which comprises a flared and rounded inner sealing surface 19 which is interrupted by the downwardly directed and shorter sealing ring 18 also having a generally triangular cross section. The radially innermost surface 20 of the ring 11 extends inwardly and upwardly to the lower surface 9 of the moulded container cover 2. The radially outermost surface 21 of the ring 11 is generally cylindrical.

For closure caps of 28 mm, typical dimensions will now be given to facilitate the showing of the preferred shape of ring 11 and the relative proportions of the surfaces and other elements. The dimensions, as indicated in Figure 5, are as follows:

	<i>Dimension</i>	<i>Length in mm</i>
	30	.76
	40	24.99
45	50	1.27
	60	1.52
	90	.23
	100	2.54

A preferred moulding material for the cap is polypropylene. Others may be used.

50 Claims

1. A one-piece moulded closure cap having a cover, a depending skirt with container-engaging means on the skirt for engaging cap-engaging means on the container rim finish below a container-engaging edge on the outside of the

rim, and a circular sealing portion on the underside of the cap cover having a flared and curved inner sealing surface for sealing engagement with the container rim outer edge and having a shorter downwardly projecting sealing ring positioned intermediate the margin of said sealing surface.

2. A closure cap as claimed in Claim 1 in which said circular sealing portion comprises a downwardly projecting sealing ring having a generally triangular cross-section with the flared and curved surface being the hypotenuse of the triangle.

3. A closure cap as claimed in Claim 2 in which said downwardly projecting sealing ring has its flared sealing surface with portions positioned to be radially inward of the outer edge of said container rim whereby said sealing ring is flexed radially outwardly while engaging the edge of the container rim.

4. A closure cap as claimed in Claim 1 or Claim 2 or Claim 3 in which the shorter sealing ring has a generally triangular cross-section and is positioned for engaging an upwardly facing surface of the container finish inwardly of the container outer rim corner.

5. A sealed package including a container sealed with a one-piece moulded closure cap having a cover and a depending skirt with container-engaging means on the skirt engaging cap-engaging means on the container rim finish below a cap-engaging edge on the outside of the rim, a circular sealing portion on the underside of the cap cover having a flared or curved inner sealing surface in sealing engagement with an outer edge on the top of the container rim and also having a shorter downwardly projecting sealing ring positioned intermediate the margins of said sealing surface.

95 6. A sealed package as claimed in Claim 5 in which said outer edge on the container comprises a step.

7. A sealed package as claimed in Claim 5 in which said outer edge on the container comprises a beveled surface.

8. A sealed package as claimed in Claim 5 in which said outer edge on the container comprises a rounded surface.

9. A sealed package as claimed in Claim 5 in which said shorter circular sealing ring comprises a downwardly extending rib having a generally triangular cross-section.

10. A one-piece moulded closure cap substantially as described herein with reference to the accompanying drawings.

11. A sealed package substantially as described herein with reference to the accompanying drawings.